AMEDNMENTS TO THE DRAWINGS

The attached replacement sheets for Figures 1 and 2 are submitted for the Examiner's approval. The attached replacement sheets omit the text below Figures 1 and 2.

Attachment: Replacement sheets

REMARKS

Claims 12-15 are pending in the application.

New replacement sheets for Figures 1 and 2 are submitted for the Examiner's approval. The new replacement sheets omit the explanatory text below each figure.

Claims 12-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Norton (U.S. Patent No. 4,422,412) ("Norton") in view of Karpuk et al. (U.S. Patent No. 4,876,986) ("Karpuk") and EP 431,357. This rejection is respectfully traversed.

The claimed invention relates to a "method of operating a compression ignition engine on an oxygenated diesel fuel composition." As such, independent claim 12 recites a "method of operating a compression ignition engine on an oxygenated diesel fuel composition comprising methanol, dimethyl ether and water" by "injecting the fuel into the combustion chamber of the engine and combusting the fuel with air." Independent claim 12 also recites that the "concentration of methanol is between 5 and 50% w/w" and "the air for combustion is preheated to a temperature of at least 60°C." Independent claim 12 further recites that the fuel composition is "obtainable by a process comprising the step of converting methanol containing up to 20% w/w of water and up to 20% w/w of ethanol or higher alcohol in a catalytic dehydration reaction . . . wherein the dehydration temperature is between 200°C and 450°C and wherein the pressure is between 10 and 400 bar."

Norton relates to a "device which converts an alcohol to an ether." (Abstract). Norton teaches that "[T]he device comprises a heat exchanger having an inlet to receive the alcohol and an outlet in communication with the inlet end of a catalytic conversion chamber, said catalytic conversion chamber containing a catalyst

capable of converting an alcohol to an ether and having an outlet pipe for leading the ether to a cylinder of the compression ignition engine." (Abstract).

Karpuk relates to a "method . . . for enhancing performance of an alcohol fueled engine during cold conditions . . . particularly effected by generation of ether to assist cold operation including starting and/or to achieve reduced emissions during cold running." (Abstract). According to Karpuk, "[D]imethyl ether is generated by catalytic dehydration of vaporized methanol using a catalyst, preferably fluorinated alumina." (Abstract).

EP 431,357 relates to the operation of an internal combustion engine on a fuel comprising up to 60% water and a carbonaceous fuel, i.e., methanol. According to EP 431,357, the fuel is introduced together with gasoline into the carburetor of a spark ignition engine, i.e., an Otto engine, at a temperature between 176 and 204°C or directly into the cylinder of the Otto engine at a temperature between 50 and 70°C. (Col. 2, lines 36-45; col. 3, line 37 to col. 4, line 25).

The subject matter of claims of claims 12-15 would not have been obvious over Norton in view of Karpuk and EP 431,357. Applicants submit that the April 19, 2005 Office Action fails to establish a *prima facie* case of obviousness. Courts have generally recognized that a showing of a *prima facie* case of obviousness necessitates three requirements: (i) some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine the reference teachings; (ii) a reasonable expectation of success; and (iii) the prior art references must teach or suggest all claim limitations. See e.g., In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Rouffet, 149 F.3d 1350, 1355 (Fed. Cir. 1998); Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573 (Fed. Cir. 1996).

In the present case, Norton, Karpuk and EP 431,357, considered alone or in combination, fail to disclose, teach or suggest all limitations of claims 12-15. None of the cited references, alone or in combination, discloses, teaches or suggests injecting the fuel composition into the combustion chamber of the engine and combusting the fuel with air, "wherein the concentration of methanol is between 5 and 50% w/w and wherein the air for combustion is preheated to a temperature of at least 60°C," as independent claim 12 recites. In addition, Norton, Karpuk and EP 431,357, alone or in combination, do not disclose, teach or suggest that the fuel composition is "obtainable by a process comprising the step of converting methanol containing up to 20% w/w of water and up to 20% w/w of ethanol or a higher alcohol in a catalytic dehydration reaction" at a temperature "between 200 and 450°C" and at a pressure ranging from 10 to 400 bar, as independent claim 12 further recites.

Norton is silent about "converting methanol containing up to 20% w/w of water and up to 20% w/w of ethanol or a higher alcohol in a catalytic dehydration reaction," as in the claimed invention. Norton teaches a compression ignition engine, i.e., a Diesel engine which is operated with up to 50% dimethyl ether (e.g., about 5 to 30% dimethyl ether being injected into the cylinder (col.2, lines 1-5)). Norton does not concern, however, compositions of methanol/dimethyl ether/water, much less compositions of methanol/dimethyl ether/water "containing up to 20% w/w of water and up to 20% w/w of ethanol or a higher alcohol," as in the claimed invention.

As the Examiner concedes, Norton also fails to disclose, teach or suggest that "the air for combustion is preheated to a temperature of at least 60°C." (see Office Action at 3). Norton teaches only that the "vaporised methanol passes from the vaporiser 24 along pipe 26 to a heat exchanger 28" and that "[T]he methanol is heated in the heat exchanger 28 and passes along pipe 42 to a catalytic converter 44 where the

methanol is partially converted to dimethyl ether and passed into pipe 46." (Col. 3, lines 40-49). Norton is silent, however, about the air for combustion being "preheated to a temperature of at least 60°C," much less about "injecting the fuel into the combustion chamber of the engine and combusting the fuel with air . . . wherein the air for combustion is preheated to a temperature of at least 60°C," as in the claimed invention.

The Examiner also concedes that Norton "does not specifically teach the pressure at which the conversion takes place." (Office Action at 3). Indeed, Norton does not provide any information about the operation pressure in the methanol conversion step. Thus, Norton does not disclose, teach or suggest "a catalytic converter . . . wherein the pressure is between 10 to 400 bar," as claim 12 recites. In addition, as the reaction of methanol to dimethyl ether and water is controlled by the operation pressure, the content of water in the prepared fuel of Norton is not -- and cannot be -- available through thermodynamic calculations.

Similarly, Karpuk fails to disclose all limitations of independent claim 12. Karpuk is silent about a methanol/dimethyl ether/water composition "wherein the concentration of methanol is between 5 and 50% w/w," as claim 12 recites. Karpuk teaches that "an ether, and, more particularly, dimethyl ether, is generated on-board the vehicle and mixed with combustion air and alcohol . . . to provide reliable cold starts and/or cold running operation to temperatures below about -30.4°C" (col. 3, lines 1-6), and not the three-component compositions of the claimed invention.

Karpuk is also silent about a fuel composition "obtainable by a process comprising the step of converting methanol containing up to 20% w/w of water and up to 20% w/w of ethanol or higher alcohol in a catalytic dehydration reaction . . . wherein the dehydration temperature is between 200°C and 450°C and wherein the pressure is

between 10 and 400 bar," as in the claimed invention. Karpuk teaches a method for providing "reliable cold starts and/or cold running operation to temperatures below about -30.4°C" (col. 3, lines 1-9), and not the limitations of claim 12.

In addition, Karpuk does not disclose, teach or suggest that the air for combustion is "preheated to a temperature of at least 60°C," much less "injecting the fuel into the combustion chamber of the engine and combusting the fuel with air . . . wherein the air for combustion is preheated to a temperature of at least 60°C," as in the claimed invention. Karpuk teaches only that "methanol is injected into mixing area 32 as a finely dispersed aerosol and is vaporized within mixing area 32 by combustion air then present within the mixing area (providing such air is sufficiently heated)." (Col. 5, lines 42-46). Karpuk further teaches that "[T]he methanol is mixed at mixing area 32 with incoming air passing through air cleaner 36 and past throttle 38" and that the mixture "is then fed into cylinder 40 of the methanol fueled engine when inlet valve 42 is opened in conventional manner." (Col. 5, lines 46-50). Thus, as acknowledged in the April 19, 2005 Office Action, Karpuk "does not specifically teach the air temperature" (Office Action at 3) and is silent about the air for combustion being "preheated to a temperature of at least 60°C," much less about "injecting the fuel into the combustion chamber of the engine and combusting the fuel with air . . . wherein the air for combustion is preheated to a temperature of at least 60°C."

EP 431,357 also fails to disclose, teach or suggest all limitations of independent claim 12. EP 431,357 is silent about "an oxygenated diesel fuel composition comprising methanol, dimethyl ether and water," as in the claimed invention. EP 431,357 teaches the operation of an internal combustion engine on a fuel comprising up to 60% water and a carbonaceous fuel, i.e., methanol. According to EP 431,357, the fuel is introduced together with gasoline into the carburetor of a spark

ignition engine, i.e., an Otto engine, at a temperature between 176 and 204°C or directly into the cylinder of the Otto engine at a temperature between 50 and 70°C. (Col. 2, lines 36-45; col. 3, line 37 to col. 4, line 25). Thus, EP 431,357 does not mention the content of ether in the fuel for operation of the engine, much less the catalytic conversion of primary fuel to ether.

The Office Action notes that "[W]hile Karpuk does not specifically teach the air temperature, EP teaches that water/alcohol fuels are mixed with preheated combustion air and that . . . the air is preheated to at least 350°F to about 400°F (177-204°C) in engines that contain carburetors and from about 122°F to about 158°F (50-70°C) for those engines that contain spark plugs." (Office Action at 3). Applicants note, however, that while EP 431,357 teaches indeed that the combustion air is preheated, EP 431,357 does not disclose, teach or suggest compositions "comprising methanol, dimethyl ether and water," as in the claimed invention. EP 431,357 teaches the operation of an internal combustion engine on a fuel comprising up to 60% water and a carbonaceous fuel (i.e., methanol), and not a fuel comprising methanol, ether and water.

Applicants also notes that, to establish a *prima facie* case of obviousness, "[i]t is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor." Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990). This way, "the inquiry is not whether each element existed in the prior art, but whether the prior art made obvious the invention as a whole for which patentability is claimed." Hartness Int'l, Inc. v. Simplimatic Engineering Co., 819 F.2d 1100, 1108 (Fed. Cir. 1987). Accordingly, a determination of obviousness "must involve more than indiscriminately combining

prior art; a motivation or suggestion to combine must exist." Pro-Mold & Tool Co., 75 F.3d at 1573.

The April 19, 2005 Office Action further fails to establish a *prima facie* case of obviousness because, as the Court in Northern Telecom, Inc. noted, "[i]t is insufficient that the prior art disclosed the components of the patented device" and there is no "teaching, suggestion, or incentive to make the combination." Northern Telecom, Inc., 908 F.2d at 934. On one hand, the crux of Norton is Diesel engine operation with compression ignition. On the other hand, EP 431357 relates to the operation of a spark ignition engine which, as commonly known, is a completely different type of engine and requires, therefore, different fuel compositions and operation parameters. Accordingly, a person of ordinary skill in the art would not have been motivated to combine the operation of the Diesel engine of Norton with the operation of the Otto engine of EP 431357. For at least these reasons, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 12-15 is respectfully requested.

Allowance of all pending claims is solicited.

Dated: July 1, 2005

Respectfully submitted,

By _____
Stephen A. Soffen
Registration No.: 31,063
Gabriela I. Coman
Registration No.: 50,515
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700
Attorneys for Applicants